

### Algorithm

```
t:=0;  
encode and initialize P(0)  
decode and evaluate P(0)  
do  
  recombine P(t)  
  mutate P(t)  
  decode P(t)  
  evaluate P(t)  
  P(t+1) = select (P(t))  
  encode P(t+1)  
  t:=t+1  
until terminate
```

Fig. 1

2/6

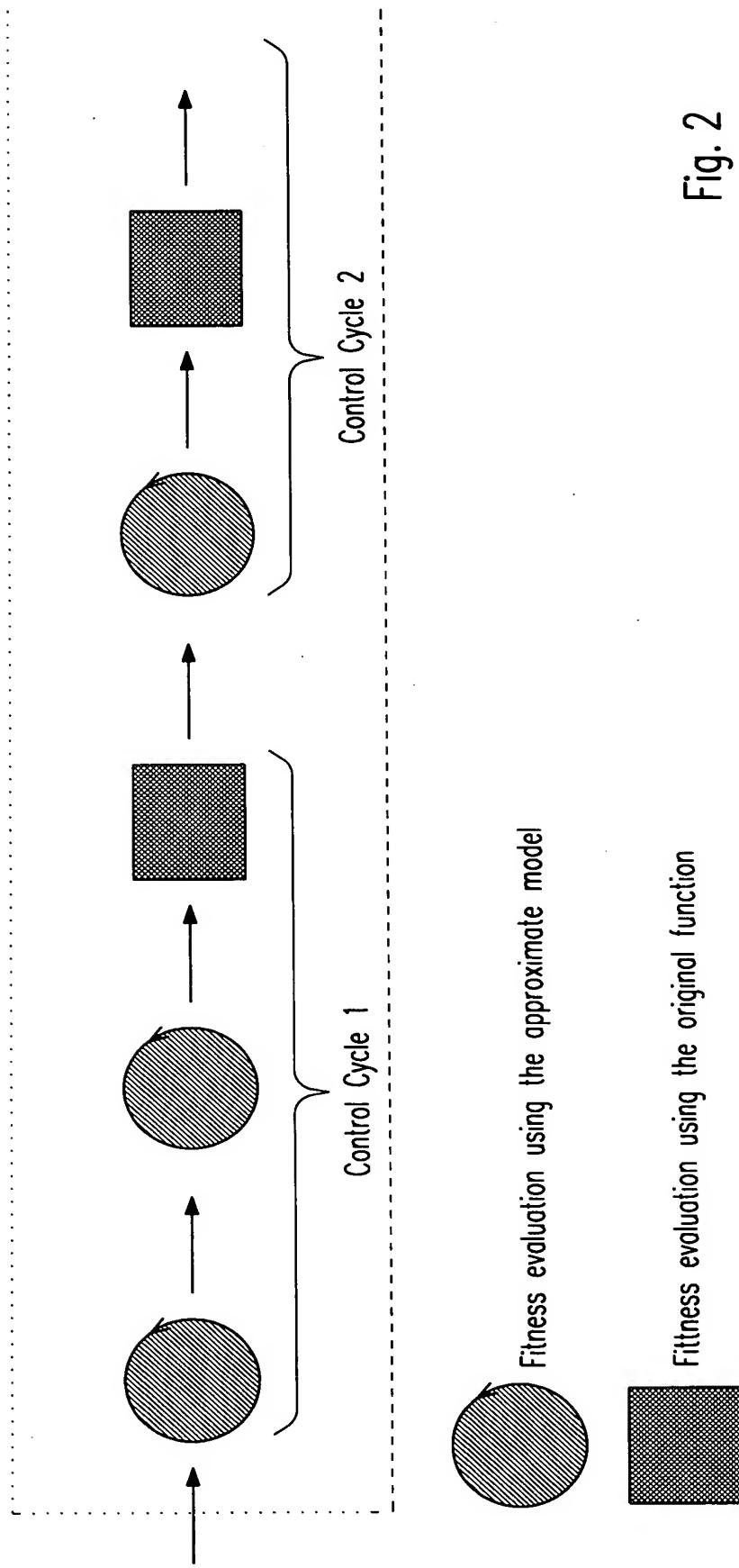


Fig. 2

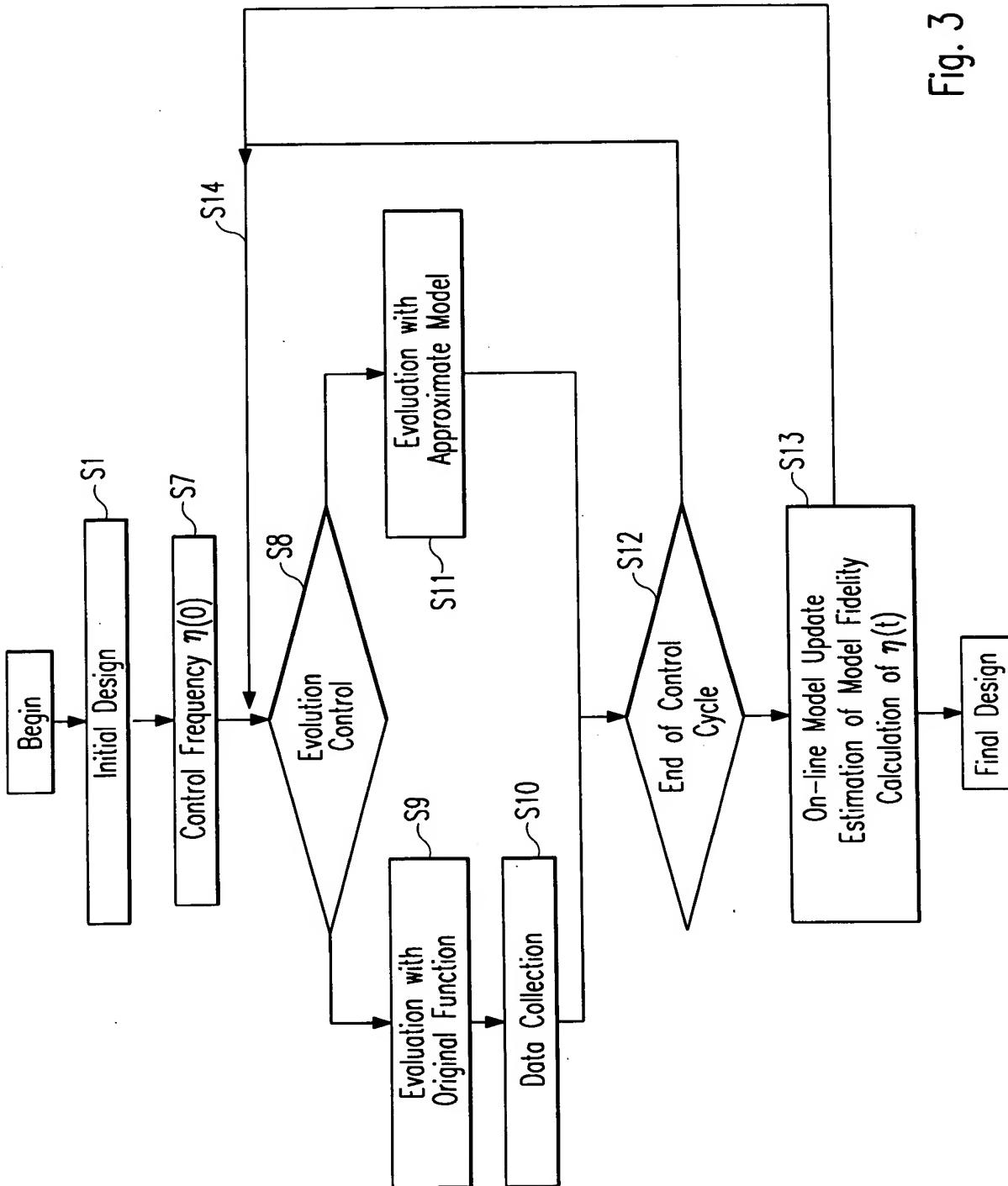


Fig. 3

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Sheet 4 of 6

4/6

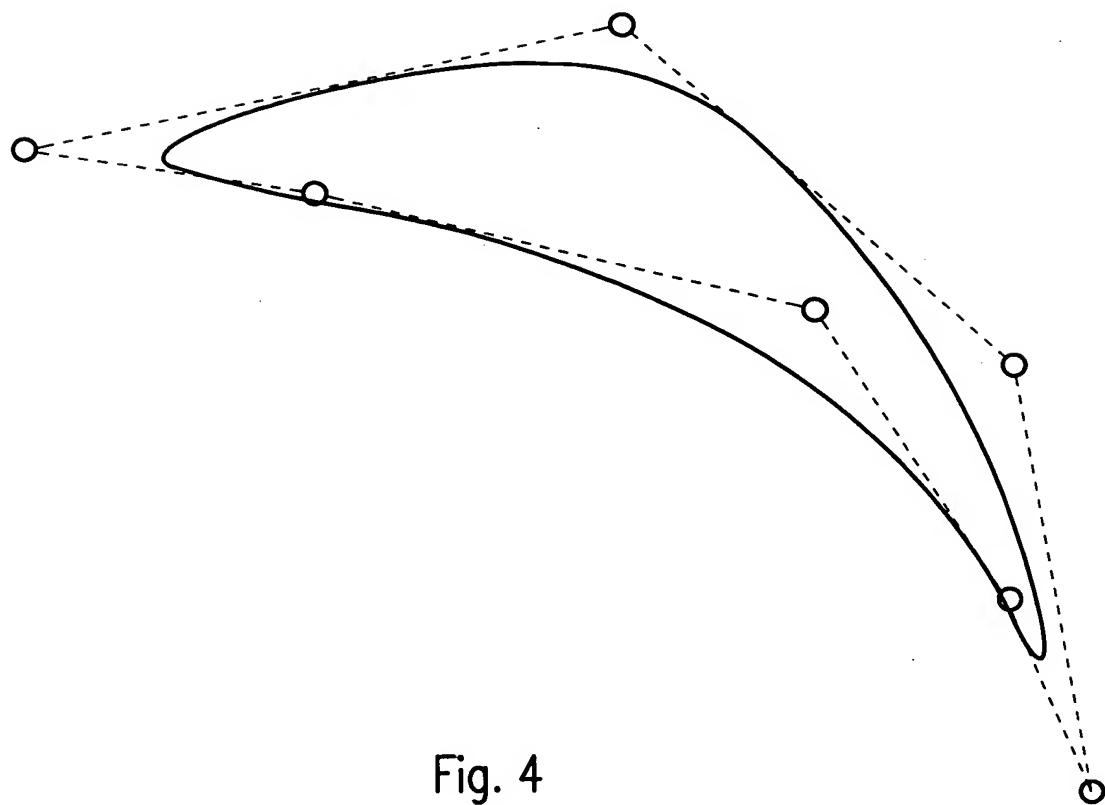
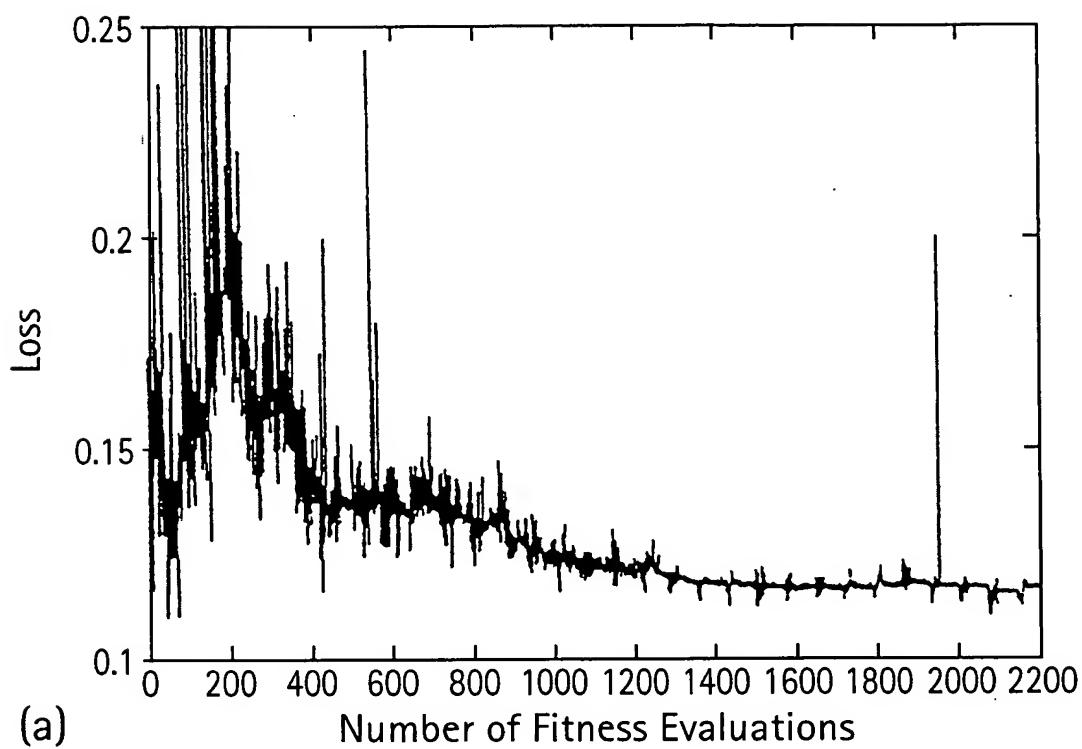
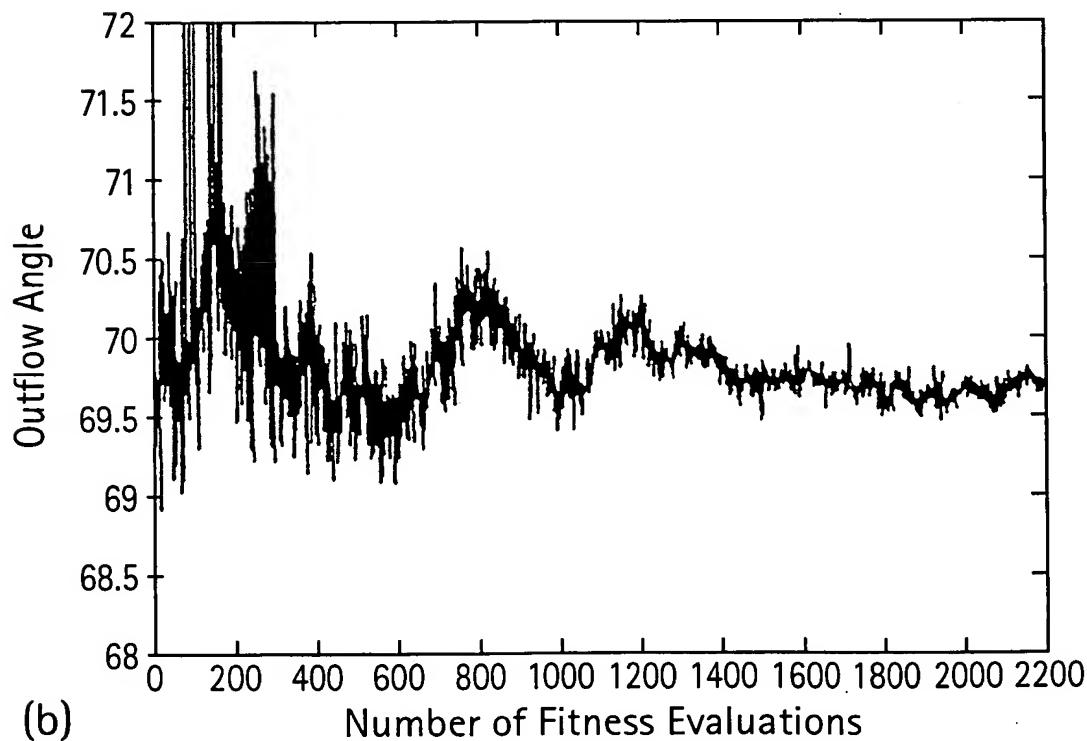


Fig. 4



(a)



(b)

Fig. 5 Blade optimization with approximate models (a) Pressure loss  
(b) Outflow angle.

6/6

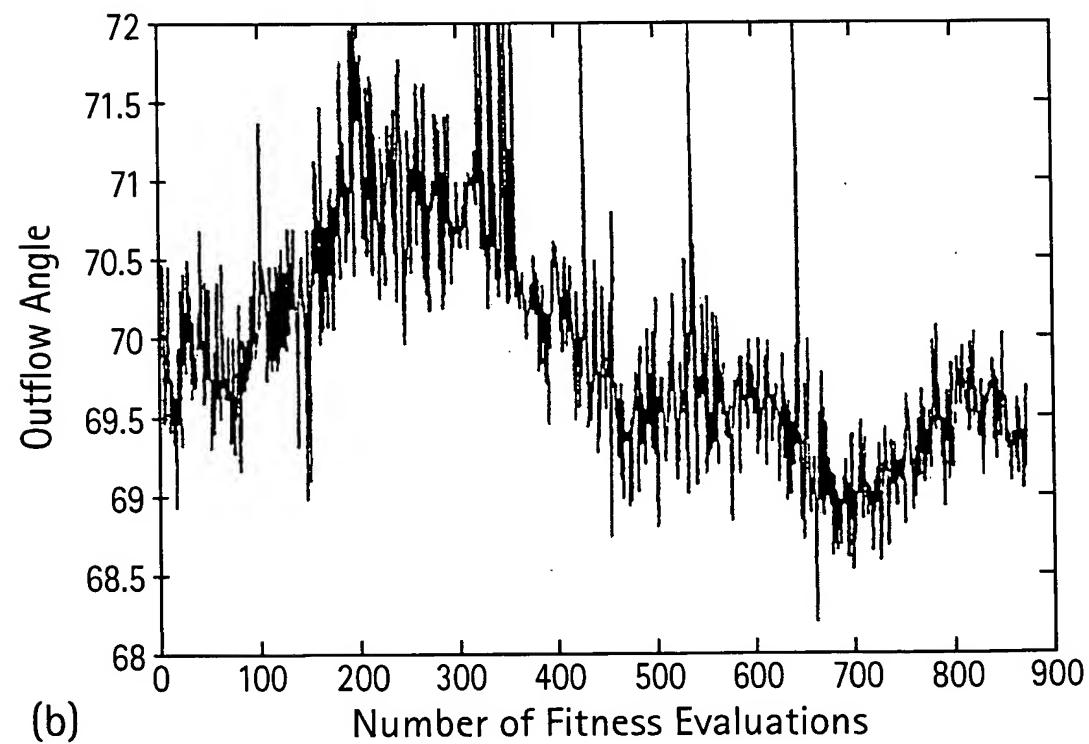
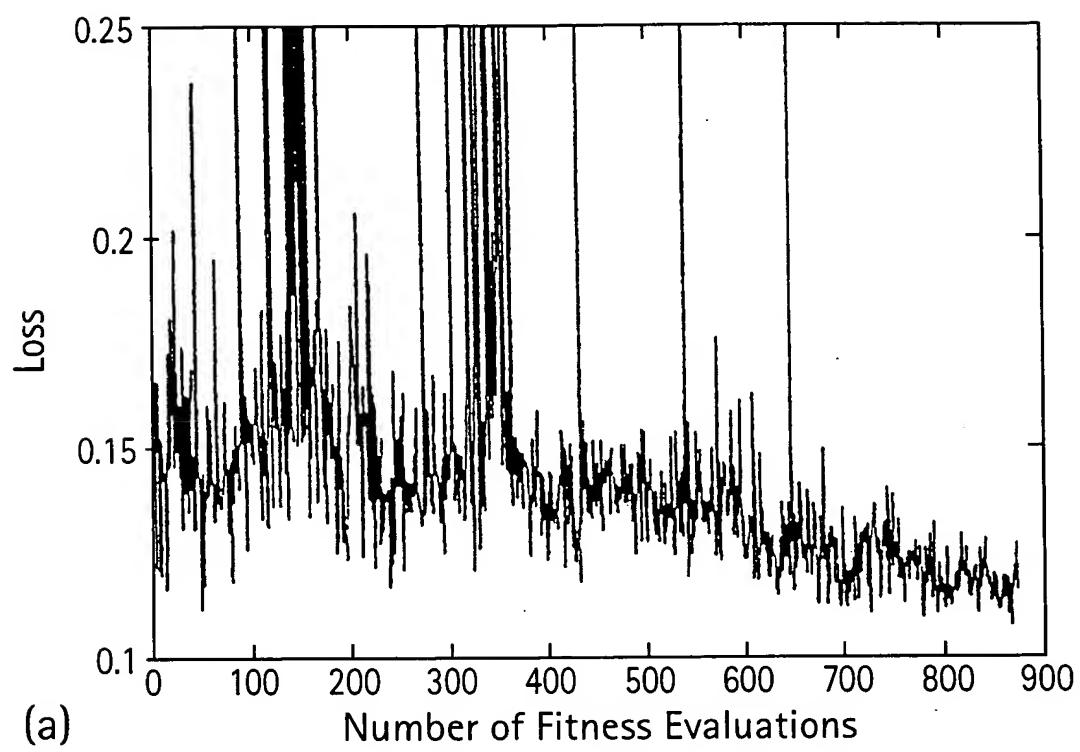


Fig. 6 Blade optimization with approximate models (a) Pressure loss  
(b) Outflow angle.